Complete Summary

GUIDELINE TITLE

Epilepsy in adults.

BIBLIOGRAPHIC SOURCE(S)

Singapore Ministry of Health. Epilepsy in adults. Singapore: Singapore Ministry of Health; 2007 Jan. 43 p. [86 references]

GUIDELINE STATUS

This is the current release of the guideline.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- December 12, 2007, Carbamazepine: The U.S. Food and Drug Administration (FDA) has provided recommendations for screening that should be performed on specific patient populations before starting treatment with carbamazepine.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Epilepsy

GUIDELINE CATEGORY

Diagnosis
Management
Treatment

CLINICAL SPECIALTY

Critical Care
Emergency Medicine
Family Practice
Internal Medicine
Neurology
Nursing

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Emergency Medical Technicians/Paramedics
Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To help general practitioners address frequently encountered and important issues on epilepsy in adults on the topics of diagnosis, treatment and other aspects of management

TARGET POPULATION

Adults in Singapore with epilepsy

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Distinguishing provoked versus unprovoked seizures
2. Electroencephalography (EEG) with photic stimulation and hyperventilation
3. Long-term video or ambulatory EEG
4. Electrocardiogram
5. Blood testing for metabolic abnormalities
6. Lumbar puncture
7. Magnetic resonance imaging (MRI)
8. Computed tomography when urgent assessment is needed or MRI is contraindicated
9. Referral to a specialist following first seizure

Initial Treatment

1. Antiepileptic monotherapy (first line therapy) with carbamazepine, phenytoin, or sodium valproate
2. Antiepileptic monotherapy with other agents (lamotrigine, phenobarbitone, clonazepam, clobazam, topiramate)
3. Add-on medications for suboptimal response to first line therapy (gabapentin, lamotrigine, topiramate, levetiracetam, tiagabine, zonisamide, oxcarbazepine)
4. Therapy for women of childbearing age or who are pregnant (antiepileptic monotherapy, folate supplementation)
5. Seizure precautions
6. Seizure first-aid
7. Home and workplace safety
8. Breastfeeding and antiepileptic therapy

Immediate Management of Seizure

1. Physical protection
2. Establishment of airway, breathing, and circulation
3. Record keeping
4. Dextrose (if hypoglycaemic)
5. Thiamine (if malnourished or with suspected ethanol abuse)
6. Intravenous diazepam or lorazepam for prolonged seizures
7. Notification of emergency medical services, if indicated

Follow-on Treatment and Management

1. Assessment of drug compliance
2. Assessment of drug toxicity
3. Titration of phenytoin dose
4. Metabolic and liver function blood tests
5. Second-choice monotherapy with phenytoin, carbamazepine, or sodium valproate
6. Adjunctive antiepileptic therapy (vigabatrin, lamotrigine, gabapentin, topiramate, tiagabine, oxcarbazepine, levetiracetam)
7. Changing formulations or brands of drugs (not recommended)
8. Withdrawal of pharmacotherapy
9. Vagus nerve stimulation
10. Complementary treatment (acupuncture, chiropractic, herbal medicine, homeopathy, osteopathy, yoga, some aroma therapy) (not recommended)
11. Ketogenic diet (not recommended)
12. Control of precipitating factors

MAJOR OUTCOMES CONSIDERED

- Number of seizures
- Frequency of seizures
- Duration of seizures
- Treatment adherence
- Incidence of pharmacotherapy side effects

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Level 1++: High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias.

Level 1+: Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias.

Level 1-: Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

Level 2++: High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

Level 2+: Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

Level 2-: Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

Level 3: Non-analytic studies, e.g. case reports, case series

Level 4: Expert opinion

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The present revision was undertaken by a group of neurologists from both public and private institutions as well as a family physician.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grade A: At least one meta-analysis, systematic review of RCTs, or RCT rated as 1++ and directly applicable to the target population; or

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

Grade B: A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 1++ or 1+

Grade C: A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 2++

Grade D: Evidence level 3 or 4; or

Extrapolated evidence from studies rated as 2+

GPP (good practice points): Recommended best practice based on the clinical experience of the guideline development group.

COST ANALYSIS

All antiepileptic drugs licensed for monotherapy have similar efficacy in newly diagnosed epilepsy. Carbamazepine, phenytoin and sodium valproate can be considered first line treatments for newly diagnosed partial and generalized tonic-clonic seizures. These three medicines are particularly cost-effective.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The recommendations that follow are those from the guideline's executive summary; detailed recommendations can be found in the original guideline document. Each recommendation is rated based on the level of the evidence and the classes of the recommendation. Definitions of the levels of the evidence (A, B, C, D, and Good Practice Point [GPP]) and classes of the recommendations (Level 1++ through Level 4) are presented at the end of the "Major Recommendations" field.

Diagnosis

GPP The following paroxysmal events may be mistaken for seizures and a primary physician should be aware of them so that he could consult the appropriate specialist, if necessary.

Patient presents with loss of awareness:

- Transient cardiac arrhythmia
- Transient ischaemic attacks
- Hypoglycemia
- Panic attacks

Patient presents with abnormal movement:

- Movement disorders in sleep and wake
- Tremor or paroxysmal choreoathetosis or dystonia
- Drop attacks and cataplexy. (**GPP**)

D Individuals requiring an electroencephalogram (EEG) should have the test performed soon after the attack. The earlier the EEG is performed, the more likely a helpful result will emerge from the EEG (Fowle & Binnie, 2000). (**Grade D, Level 3**)

D EEG should be performed to support a diagnosis of epilepsy in adults in whom the clinical history suggests that the seizure is likely to be epileptic in origin (Fowle & Binnie, 2000). (**Grade D, Level 3**)

D An EEG should not be performed in the case of probable syncope because of the possibility of a false positive result (Fowle & Binnie, 2000). (**Grade D, Level 3**)

D EEG should not be used in isolation to make a diagnosis of epilepsy because it can be falsely positive (Fowle & Binnie, 2000; Smith, Defall, & Chadwick, 1999). (**Grade D, Level 3**)

D Repeated EEG may be helpful when the diagnosis of epilepsy is unclear ("Proposal for revised clinical", 1981; King et al., 1998). When a standard EEG has not contributed to diagnosis or classification, a sleep EEG should be performed (Fowle & Binnie, 2000). (**Grade D, Level 3**)

C Long-term video or ambulatory EEG may be used in the assessment of individuals who present diagnostic difficulties after clinical assessment and standard EEG (Thompson & Ebersole, 1999). (**Grade C, Level 2+**)

D Photic stimulation and hyperventilation should be a part of standard EEG assessment (Fowle & Binnie, 2000). (**Grade D, Level 3**)

D Electrocardiogram (ECG) should be performed in the assessment of all patients with altered consciousness, particularly in the older age group when cardiac arrhythmias can simulate epilepsy (Zaidi et al., 2000). (**Grade D, Level 3**)

GPP Routine blood studies are indicated to identify common metabolic causes of seizure such as abnormalities in electrolytes, glucose, calcium, magnesium, hepatic and renal diseases. Screening for toxins is sometimes done. Lumbar puncture is necessary when meningitis or encephalitis is suspected. (**GPP**)

D Magnetic resonance imaging (MRI) is the imaging of choice in patients with epilepsy ("Recommendations for neuroimaging," 1997; "Guidelines for neuroimaging," 1998) and is particularly useful in those:

- Who have suggestions of a focal seizure onset from history, examination or EEG.
- In whom seizures continue in spite of first line medication. (**Grade D, Level 4**)

D Computed tomography (CT) scan has a role in the urgent assessment of seizures or when MRI is contraindicated ("Scottish Intercollegiate Guidelines Network [SIGN]," 2003). (**Grade D, Level 4**)

D Brain imaging is not routinely required when there is a confident diagnosis of idiopathic generalised epilepsy and if there is rapid and complete response to the first line antiepileptic drugs ("Recommendations for neuroimaging," 1997). (**Grade D, Level 4**)

Initial Treatment

D Before making the decision to start antiepileptic drugs after a first unprovoked seizure, it is important to verify that the patient has had only one unprovoked seizure, and to confirm that there is no prior history of absence or myoclonic seizures, or partial seizures (SIGN, 2003). (**Grade D, Level 4**)

D The decision to start antiepileptic drugs after a first unprovoked seizure is based on the risk of seizure recurrence. Early treatment with antiepileptic drugs after a first seizure approximately halves the recurrence risk but does not alter the long-term prognosis of the epilepsy. The decision to treat is made on individually tailored basis (SIGN, 2003; O'Dell & Shinnar, 2001). (**Grade D, Level 4**)

D The overall risk of a second seizure occurring after a first unprovoked seizure ranges between 27-52% (O'Dell & Shinnar, 2001). However, this is an overall estimate and the recurrence risk of another seizure after a first unprovoked seizure increases to over 80% in the presence of (1) epileptiform abnormalities on the EEG, (2) a neurological deficit, and (3) a structural abnormality in the brain. Antiepileptic drugs therefore should be offered to the patient in these 3 circumstances (SIGN, 2003; O'Dell & Shinnar, 2001). (**Grade D, Level 4**)

D Antiepileptic drugs should also be considered if the patient or his/her carers consider the risk of a recurrent seizure unacceptable (SIGN, 2003; National Institute of Clinical Excellence [NICE], 2004). (**Grade D, Level 4**)

D Starting antiepileptic drug treatment is often not a straightforward decision, and the decision should be made jointly with the patient (or his/her caregiver) after explaining the risks and benefits and after assessing his/her preferences. In other words, the decision should be individualized (SIGN, 2003). (**Grade D, Level 4**)

B The risk of seizure recurrence after 2 unprovoked seizures is 73%. Antiepileptic drugs therefore should be offered to the patient after explaining the risks and benefits and after assessing his/her preferences (NICE, 2004; Hauser et al., 1998). (**Grade B, Level 2++**)

A Antiepileptic drug treatment strategy should be individualised according to the seizure type, epilepsy syndrome, co-medication, co-morbidity and the individual's lifestyle and preferences (and/or those of their family and/or carers as appropriate) (Beghi et al., 2003; Kwan & Brodie, "Epilepsy after the first drug fails," 2000; Fakhoury et al., 2004; Wheless et al., 2004; Privitera et al., 2003; Kaminow et al., 2003). (**Grade A, Level 1++**)

A Patients should be commenced on monotherapy initially. Should the patient develop an adverse reaction to the initial drug or if the initial monotherapy is unsuccessful, monotherapy using another drug should be tried (Beghi et al., 2003; Kwan & Brodie, "Epilepsy after the first drug fails," 2000; Fakhoury et al., 2004; Wheless et al., 2004; Privitera et al., 2003; Kaminow et al., 2003). (**Grade A, Level 1++**)

A All antiepileptic drugs licensed for monotherapy have similar efficacy in newly diagnosed epilepsy. For this reason, the medicine the prescribing physicians are most familiar with can be used (Kwan & Brodie, 2001; Perucca et al., 2000; Browne & Holmes, 2001). (**Grade A, Level 1++**)

A Carbamazepine, phenytoin and sodium valproate can be considered first line treatments for newly diagnosed partial and generalized tonic-clonic seizures (Tudur, Marson, & Williamson, 2003; Tudur et al., 2002; Marson et al., 2003; Marson et al., 2002). (**Grade A, Level 1+**)

A Sodium valproate, lamotrigine and clonazepam may be prescribed for absence and myoclonic seizures (Panayiotopoulos, Obeid, & Tahan, 1994; Gazda et al., 2000; Delgado-Escueta & Enrile-Bacsal, 1984; Penry, Dean, & Riela, 1989; Loiseau, Duche, & Pedespan, 1995; Posner, Mohamed, & Marson, 2005). (**Grade A, Level 1++**)

A Newer antiepileptic medications (gabapentin, lamotrigine, topiramate, levetiracetam, tiagabine, zonisamide, oxcarbazepine) are recommended as add-on medications for the treatment of individuals who have suboptimal treatment response to the older medications (phenytoin, carbamazepine, sodium valproate, phenobarbitone, clonazepam, clobazam) or as monotherapy (lamotrigine, topiramate) in individuals whom the older medications are unsuitable (adverse drug reactions, intolerable side effects, multiple drug interactions to concomitant medications) (Beghi et al., 2003; Kwan & Brodie, "Epilepsy after the first drug fails," 2000; Fakhoury et al., 2004; Wheless et al., 2004; Privitera et al., 2003; Kaminow et al., 2003; "Review: 6 newer drugs," 1997; Sackellares et al., 2002; Chadwick & Marson, 2005; Jette, Marson, & Hutton, 2005; Pereira, Marson, & Hutton, 2005; Chaisewikul et al., 2005; Marson et al., 2005; Castillo, Schmidt, & White, 2005). (**Grade A, Level 1++**)

C For women of childbearing age or who are pregnant, the appropriate antiepileptic monotherapy at the lowest dose to control seizures is recommended (Adab et al., 2005). (**Grade C, Level 2++**)

A Folate supplementation is recommended for women of childbearing age on antiepileptic treatment to prevent neural tube defects. Folic acid, 5 mg per day, should be given in these women from pre-conception till the first trimester of pregnancy (Lumley et al., 2005; "Prevention of neural tube defects," 1991; Lewis et al., 1998; Hernandez-Diaz et al., 2000; Dansky et al., 1987). (**Grade A, Level 1++**)

GPP Seizure precautions - people with epilepsy and their carers should be educated that the following are associated with increased risk for breakthrough seizures:

a. Non-compliance to antiepileptic medication or drug interactions with antiepileptic medications lowering blood levels of antiepileptic drugs
b. Alcohol abuse
c. Sleep deprivation
d. Concurrent illness (**GPP**)

GPP Seizure first-aid:

a. Place the seizing individual in recovery position or on his/her side.
b. Remove surrounding objects that may harm the individual.
c. Do not place any object in the individual's mouth.
d. Call for an ambulance in the event of injury during seizure, prolonged seizure (>5 minutes), or seizure clustering without return to individual's baseline state. (**GPP**)

D Home and workplace safety (SIGN, 2003):

a. Minimise exposure to open fires and sharp instruments. Microwave ovens, blenders are options to consider.
b. Refrain from soaking in baths over extended periods of time or locking toilet doors; showers should be preferred over baths.
c. Operation of heavy machinery is discouraged. (**Grade D, Level 4**)

D Antiepileptic drugs are not a contraindication for women to breastfeed. All breastfeeding mothers on antiepileptic drugs should be encouraged to breastfeed and receive support from relevant healthcare personnel (SIGN, 2003). (**Grade D, Level 4**)

GPP Women with epilepsy should be referred to specialist care for preconception counseling as indicated. (**GPP**)

D Immediate management of seizure (Henry, 2003)

- Remove hazards from the immediate surroundings.
- Protect the patient from falling unsupported to the ground or striking objects.
- Position the patient on their side, with the head supported in a neutral in-line position.
    - Protect the head and other parts of the body from striking objects but do not restrain the patient.
- Establish Airway, Breathing and Circulation (ABC) and administer high concentration oxygen.
- Observe and record the pattern of the seizure(s).
- Note and record the duration of the seizure(s).
- Do not force anything, including your fingers, into the person's mouth. This may cause injuries such as chipped teeth or a fractured jaw. You could also get bitten. (**Grade D, Level 4**)

GPP If the clinical scenario is suggestive of hypoglycaemia, capillary blood glucose level should be checked. With confirmed hypoglycaemia, the patient should be treated with 50 mL of Dextrose 50%. In the setting of malnutrition or suspected ethanol abuse, 100 mg thiamine may also be given as an intravenous push. (**GPP**)

D When convulsive seizures continue beyond 5 minutes, pharmacotherapy to abort the seizure is recommended (Wyllie, 2006). (**Grade D, Level 4**)

A Intravenous diazepam and lorazepam are effective first line treatments for prolonged seizures in the community. (**Grade A, Level 1+**)

D Initially a dose of 5-10 mg diazepam is given either intravenously or rectally. If there is no response, the same dose can be repeated after 10 minutes. Respiratory or circulatory effects should be monitored for and usually come into effect with doses greater than 20 mg (Wyllie, 2006). (**Grade D, Level 4**)

GPP Emergency medical services (EMS) should be activated if:

- Seizures continue beyond 5 minutes.
- Cardio-respiratory complications from treatment develop and there are no adequate conditions for monitoring the patient's condition.
- There is suspected fracture or central nervous system injury from the seizure. (**GPP**)

Follow-on Treatment and Management

D Antiepileptic drug levels may help clinical management under the following clinical indications: (1) assessment of compliance to drug treatment for patients with refractory epilepsy (2) assessment of symptoms due to possible antiepileptic drug toxicity (3) titration of phenytoin dose (SIGN, 2003; NICE). Routine checking of antiepileptic drug levels without a clear clinical indication is not required, and is not cost-effective (SIGN, 2003; NICE, 2004). (**Grade D, Level 4**)

GPP Depending on clinical suspicion of other differential diagnoses, blood tests such as blood glucose, urea, electrolytes, liver function tests and serum calcium may be indicated. (**GPP**)

B Before commencing multiple antiepileptic drug therapy, monotherapy involving two of the standard drugs (phenytoin, carbamazepine, sodium valproate) should have been tried. When two of these antiepileptic drugs have failed as monotherapy, the chance of seizure-freedom with further monotherapy is very low (Kwan & Brodie, "Early identification," 2000). (**Grade B, Level 1+**)

B If acceptable seizure control is not achieved with monotherapy using phenytoin, sodium valproate or carbamazepine: add sodium valproate to carbamazepine or phenytoin, add carbamazepine or phenytoin to sodium valproate (Heller et al., 1995; Richens et al, 1994; Turnbull et al., 1985; Mattson et al., 1985; Mattson, Cramer, & Collins, 1992). (**Grade B, Level 1++**)

A Systematic review has confirmed the efficacy and tolerability of the newer antiepileptics vigabatrin, lamotrigine, gabapentin, topiramate, tiagabine, oxcarbazepine and levetiracetam. All may be used as **adjunctive** therapy for patients with drug-resistant, focal epilepsy (SIGN, 2003; Wilby et al., 2005). (**Grade A, Level 1++**)

A Although newer antiepileptic drugs (gabapentin, lamotrigine, levetiracetam, oxcarbazepine, tiagabine, topiramate) have been shown to be effective, there is little good quality evidence from clinical trials supporting their superiority as adjunctive therapy over older drugs (Wilby et al., 2005). (**Grade A, Level I+**)

D If trials of combination therapy do not confer benefit, treatment should revert to the regimen (monotherapy or combination therapy) that has proven most acceptable to the individual, in terms of providing the best balance between effectiveness in reducing seizure frequency and tolerability of side effects (Guberman & Corman, 2000). (**Grade D, Level 3**)

D Changing the formulation or brand of antiepileptic drugs is not recommended because different preparations may vary in bioavailability or have different pharmacokinetic profiles and, thus, increased potential for reduced effect or excessive side effects (Guberman & Corman, 2000). (**Grade D, Level 3**)

D Lamotrigine, topiramate, levetiracetam and sodium valproate have a wide spectrum of activity for most types of generalised seizures. Although there is no published evidence of an " add-on" effect of these drugs in generalised epilepsies, this is supported by circumstantial evidence. Any one of these drugs can be added to a standard antiepileptic drug (phenytoin, carbamazepine, sodium valproate) (SIGN, 2003). (**Grade D, Level 4**)

D Addition of a third antiepileptic may be worth trying if an encouraging but sub-optimal effect is obtained with a particular combination of two drugs (SIGN, 2003). (**Grade D, Level 4**)

GPP All individuals with a first-onset suspected seizure should be evaluated by a specialist who has experience in epilepsy. This is to ensure accurate and early diagnosis, and initiation of appropriate therapy. Subsequent follow-up can be carried out by a general practitioner. (**GPP**)

A Withdrawal of antiepileptic drugs can be explored at the end of at least a two-year seizure-free period, after a discussion on the potential risks and benefits (Sirven, Sperling, & Wingerchuk, 2001). (**Grade A, Level 1+**)

A The decision to withdraw treatment should be individualised, taking into account lifestyle issues and a clear plan agreed upon should the seizures recur (Sirven, Sperling, & Wingerchuk, 2001). (**Grade A, Level 1+**)

D A repeat EEG prior to initiation of drug withdrawal is not routinely required (O'Dell & Shinnar, 2001). (**Grade D, Level 4**)

D Withdrawal of treatment should be a gradual process. There is no clear evidence for the length of the withdrawal period although most specialists would advocate a period of few months. Patients on polytherapy should have only one drug withdrawn at a time (O'Dell & Shinnar, 2001). (**Grade D, Level 4**)

D Patients on benzodiazepines or barbiturates should have these medications reduced over a longer time-course (up to 6 months or longer) (O'Dell & Shinnar, 2001). (**Grade D, Level 4**)

A Vagus nerve stimulation is indicated for adjunctive therapy and has been shown to reduce frequency of seizures in adults refractory to antiepileptic medication who are not suitable for epilepsy surgery. This includes adults whose epileptic disorder is dominated by partial seizures (with or without secondary generalisation) or generalised seizures (Privitera et al., 2002). (**Grade A, Level 1+**)

A Complementary treatment such as acupuncture, chiropractic, herbal medicine, homeopathy, osteopathy and yoga should not be advised to the epileptic patient (Stavem et al., 2000; Cott, 2001). (**Grade A, Level 1+**)

D Patients should be asked if they are using any complementary medicines and warned about the possibility of adverse effects. Problems may arise with the use of some herbal medicines because of interaction with prescribed medication. The potential reduction of the plasma concentrations of carbamazepine and phenytoin should be noted if St John's Wort is used concomitantly. Caution is also advised in the use of evening primrose oil but the evidence for this is less robust (Spinella, 2001). (**Grade D, Level 4**)

D Some aromatherapy preparations (e.g. hyssop, rosemary, sweet fennel, sage and wormwood) may have an alerting effect on the brain and so may exacerbate seizures (SIGN, 2003). (**Grade D, Level 4**)

D The ketogenic diet is not recommended for adults with epilepsy. There is no evidence of a worthwhile therapeutic effect. In addition, compared to children, in adults, it is difficult for dietary measures to result in great enough ketogenicity (NICE, 2004). (**Grade D, Level 4**)

C There is evidence that control of precipitating factors (emotional stress, sleep deprivation) may help better control seizures. This can only be recommended in addition to pharmacological treatments (Nakken et al., 2005). (**Grade C, Level 2+**)

Definitions:

Levels of Evidence:

Level 1++: High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias.

Level 1+: Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias.

Level 1-: Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

Level 2++: High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

Level 2+: Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

Level 2-: Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

Level 3: Non-analytic studies (e.g. case reports, case series)

Level 4: Expert opinion

Grades of Recommendation:

Grade A: At least one meta-analysis, systematic review of RCTs, or RCT rated as 1++ and directly applicable to the target population; or

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

Grade B: A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 1++ or 1+

Grade C: A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or

Extrapolated evidence from studies rated as 2++

Grade D: Evidence level 3 or 4; or

Extrapolated evidence from studies rated as 2+

GPP (good practice points): Recommended best practice based on the clinical experience of the guideline development group.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate diagnosis, treatment and management of adults with epilepsy

POTENTIAL HARMS

- False-positive electroencephalographic results in cases of syncope or when used in isolation to make a diagnosis
- Side effects from antiepileptic drugs

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- These guidelines are not intended to serve as a standard of medical care. Standards of medical care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge advances and patterns of care evolve.
- The contents of this publication are guidelines to clinical practice, based on the best available evidence at the time of development. Adherence to these

guidelines may not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care. Each physician is ultimately responsible for the management of his/her unique patient in the light of the clinical data presented by the patient and the diagnostic and treatment options available.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The desired clinical outcome for epilepsy in the adult is seizure control at a level which enables the patient being able to live a normal as possible private and public life. In general this will mean that treatment will aim to reduce the number and severity of seizures whilst causing as few side effects as possible.

Audit should look at:

- Proportion of patients who are compliant with the medication (if using monotherapy with phenytoin, tegretol or sodium valproate, 70% should be compliant).
- Proportion of patients who change or stop medication because of side effects (Less than 10 % change medications because of side effects).

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Personal Digital Assistant (PDA) Downloads
Quick Reference Guides/Physician Guides

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Singapore Ministry of Health. Epilepsy in adults. Singapore: Singapore Ministry of Health; 2007 Jan. 43 p. [86 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2007 Jan

GUIDELINE DEVELOPER(S)

Singapore Ministry of Health - National Government Agency [Non-U.S.]

SOURCE(S) OF FUNDING

Singapore Ministry of Health

GUIDELINE COMMITTEE

Workgroup on Epilepsy in Adults

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Workgroup Members: A/Prof Einar Wilder Smith, Senior Consultant, Division of Neurology, Department of Medicine, National University Hospital (*Chairman*); Dr Andrew Pan Beng Siong, Consultant Neurologist, Mt. Elizabeth Medical Centre, Visiting Consultant, National Neuroscience Institute (SGH Campus); Dr Nigel Tan Choon Kiat, Consultant, National Neuroscience Institute (TTSH Campus); Dr K Puvanendran, Senior Consultant, National Neuroscience Institute (SGH Campus); Dr Rahul Rathakrishnan, Registrar, Division of Neurology, Department of Medicine, National University Hospital; Dr Adrian Tan, Neurologist, MD Specialist Healthcare; Dr Tan Yew Seng, Family Physician, Medical Director, Assisi Home and Hospice

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Singapore Ministry of Health Web site.

Print copies: Available from the Singapore Ministry of Health, College of Medicine Building, Mezzanine Floor 16 College Rd, Singapore 169854.

AVAILABILITY OF COMPANION DOCUMENTS

The full text guideline and summary card are available for PDA download in ISilo and MSReader formats from the Singapore Ministry of Health Web site.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on May 11, 2007. This summary was updated by ECRI Institute on January 10, 2008, following the U.S. Food and Drug Administration advisory on Carbamazepine.

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DISCLAIMER

NGC DISCLAIMER

Readers with questions regarding guideline content are directed to contact the guideline developer.

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